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CH2MHILL

September 5, 2001

Christine M. Kump
Environmental Engineer
Missouri Department of Natural Resources
Hazardous Waste Program
1738 E. Elm (Lower Level)
Jefferson City, MO 65101

Subject: Corrective Action Work Plan
Modine Manufacturing Company
Camdenton, Missouri

Dear Ms. Kump:

CH2M HILL is submitting the enclosed Corrective Action Work Plan on behalf of Modine Manufacturing Company. The Corrective Action Work Plan has been revised to addresses the Missouri Department of Natural Resources comments provided in your August 29, 2001 letter to Mr. Thomas Sanicola of Modine. Pursuant to our discussion of yesterday, Section 2.3 - Confirmation Sampling has been modified to reflect a discrete sample interval of 10 feet rather than collecting three discrete samples over a 25 feet interval and using the arithmetic average. Also as we discussed the characterization sampling for off-site disposal will remain as a composite sample and not be changed to discrete sampling as originally requested. The composite sampling is in accordance with the disposal facilities requirements (Section 2.4).

Please free to call me with any questions you may have. I can be reached at 314-421-0900.

Sincerely,

CH2M HILL

Daniel J. Price, R.G.
Project Manager

stl\MDNRcoverletter.doc

c: Thomas Sanicola - Modine Manufacturing Company
Steven Poplawski - Bryan Cave LLP
Kurt Hollman – DGLS
David Garrett – EPA Region VII

Work Plan

Corrective Action

Submitted to

Modine Manufacturing Company

September 2001

CH2MHILL

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1.0 Introduction

This Work Plan outlines excavation procedures that will be followed during the Corrective Action at the Modine Manufacturing Company (Modine) facility located at 179 Sunset Drive in Camdenton, Missouri. Excavation and sampling procedures described in this Work Plan will be managed by CH2M HILL Construction, Inc. (CCI) on behalf of Modine. Modine is undertaking the Corrective Action detailed in this Work Plan to address the contamination associated with the Hot Spot delineation at boring B-13 undertaken pursuant to the Missouri Department of Natural Resources (MDNR) Corrective Action Abatement Order on Consent and agreed Statement of Work issued in July 1999.

1.1 Background

Modine occupies approximately 100 acres (±) in Camdenton, Missouri, approximately 180 miles southwest of St. Louis, Missouri (see Figure 1). The plant, which occupies approximately 2 acres (±), currently manufactures heat transfer products.

During an investigation in 1995, a boring was advanced west of the manufacturing building along a storm sewer and exhibited elevated VOC concentrations in a soil sample collected from directly above bedrock. The soil sample exhibited trichloroethene (TCE) and tetrachloroethene (PCE) concentrations in excess of the current MDNR Cleanup Levels for Missouri (CALM) Soil Target Concentration (STARC) Leaching to Groundwater Pathway (C_{LEACH}) level. Reported concentrations were 204 parts per million (ppm) of TCE and 2.18 ppm of PCE.

In October 2000, CH2M HILL conducted a field investigation that consisted of the collection of soil samples to better define the lateral extent of contamination surrounding the former boring. Four borings were advanced during the investigation. The effort confirmed the presence in subsurface soil of the TCE degradation products, vinyl chloride, and cis-1,2-dichloroethene (DCE).

During December 2000, CH2M HILL conducted another investigation that advanced eight direct push soil probes to better define the lateral extent of soil contamination from chlorinated VOCs. Seven probes were advanced around the October borings. The eighth probe was advanced down gradient of the area of interest. The results indicated that vinyl chloride exceeded the CALM STARC C_{LEACH} level in each of the eight new borings and cis-1,2 DCE exceeded the CALM STARC C_{LEACH} level in four borings.

The lateral extent of the chlorinated VOC impact to soil in the area of interest near the former boring, was reasonably well defined after the October and December 2000 investigations. The extent of contamination covers an area of approximately 4,000 square feet.

1.2 Objectives

The primary objective of the Corrective Action presented in this Work Plan is to remove impacted soil contaminated with VOCs at concentrations above MDNR CALM STARC C_{LEACH} levels at the Modine facility. The secondary objective is to conduct the Corrective Action in a safe and secure manner. The Health and Safety Plan (HSP) for Modine has been updated to address potential health and safety issues associated with corrective action activities included in this Work Plan. The HSP is presented in Attachment 1. The approach for meeting project objectives during the Corrective Action is described below.

1.3 Approach

Excavation and off-site disposal of the impacted soil as a special waste at an appropriately permitted landfill was selected as the most cost-effective corrective action at the site. This decision was based on the anticipated small volume of soil actually impacted with VOCs. Based on the results of the previous investigations conducted by CH2M HILL, it appears that impacted soil is limited to at or near the soil-bedrock interface. Therefore, the impact is limited to approximately three feet of soil directly above the bedrock surface and this is the only volume of soil expected to require off-site disposal. The remaining overburden, averaging approximately nine feet thick, will be stockpiled on-site and used as backfill in the excavation.

In accordance with MDNR's recommendation, MDNR CALM STARC C_{LEACH} levels were selected as the Corrective Action Cleanup Goals (CACGs) for this effort. CACGs for the chemicals of concern identified from previous investigations are summarized below in Table 1.

TABLE 1
Corrective Action Cleanup Goals
Modine Manufacturing Company – Camdenton, Missouri

Chemical Compound	CACGs (ppm)
Vinyl Chloride	0.02
1,1- Dichloroethene	0.09
Trans 1,2-Dichloroethene	1.0
Cis 1,2- Dichloroethene	0.5
Trichloroethene	0.1
1,1,2-Trichloroethane	0.04
Tetrachloroethene	0.1

2.0 Scope of Work

This section provides the tasks to be performed and the field procedures that will be followed during the Corrective Action at Modine.

2.1 Pre-excavation Activities

Before conducting excavation activities, Modine facility personnel will assist Missouri One-call in locating utilities in the excavation area. Excavation activities will not begin until utilities have been clearly marked. After utilities have been located, approximate excavation limits will be designated in the field using paint, stakes or flags.

It is known that a 16-inch diameter storm sewer line is located within the anticipated excavation limits. Approximately 50 to 60 feet of this line, which drains the roof of the building, will require removal during excavation and subsequent replacement during restoration activities.

2.2 Excavation Activities

Excavation activities will begin on the western slope, just west of the parking lot, halfway between the top of the slope and the toe of the slope. The approximate excavation area is detailed in Figure 2. Soil will be removed in lifts from the surface down to bedrock. Past investigations have indicated that the impact to soil is limited to soil at and near the bedrock interface. Therefore, it is assumed that the impacted material is restricted to the three feet of material resting on top of the bedrock surface. The excavation will work itself eastward into the slope. It is anticipated that the excavation will extend approximately 60 feet east of the starting location. Excavation dimensions will be measured, but not surveyed, and measurements tied to on site landmarks such as building corners.

Impacted soil and non-impacted soil will be segregated into separate stockpiles. Segregation determinations will be made in the field using a photoionization detector (PID). Excavation will continue until field screening does not indicate VOC contamination. The side walls of the excavation will be sloped (2:1) in accordance with Occupational Safety and Health Administration (OSHA) guidance to allow safe entry into the excavation.

The stockpiles will be located on the open field west of the excavation. The approximate stockpile locations are detailed in Figure 2. The non-impacted soil stockpiles will be divided into manageable units for sampling of approximately 500 cubic yards. The impacted stockpile will be placed on plastic sheeting and covered with tarps. A temporary containment berm will also be constructed to preclude runoff of stormwater from the impacted material. It should be noted that none of the impacted material will be hauled from the site for disposal until the excavation is complete. This will allow for the reassessment of remedial options if significantly more impacted material is excavated than anticipated.

If supplemental excavation is necessary following the receipt of confirmation sampling results, additional excavation of the soil segment exhibiting concentrations above RACGs will be conducted. One confirmation side-wall sample will be collected from each over-excavated side-wall segment according to the procedures outlined in Section 2.3.

Based on the results of previous investigations, it is anticipated that shallow groundwater will not be encountered at the soil/bedrock interface. However, if groundwater does accumulate inside the excavation, a sample will be collected and analyzed for VOCs. The groundwater sample results will serve as an indicator of groundwater conditions and will not be used for disposal profiling. Any accumulated groundwater will be pumped by the excavation contractor to Modine's on-site treatment plant for treatment prior to disposal via the City of Camdenton Sanitary Sewer System.

2.3 Confirmation Sampling

Confirmation sampling at the excavation site will be conducted after the following tasks have been completed:

- Soil is excavated to the extent and depth specified above.
- Based on field screening, additional soil is removed as necessary until field screening results indicate that contamination above RACGs is no longer present in the excavation side walls.

A consistent, pre-selected confirmation sample spacing will be implemented during the Corrective Action. A linear spacing of 10 feet along the exposed excavation side-wall will be used. The rim of the excavation will be divided into 10-foot segments beginning at the southwest entrance point to the excavation. Dimensions less than 10 feet, if any, will be designated as individual segments. Each segment will define the width of a side-wall sampling area that will extend from the excavation floor to top of the contaminated soil column. The contaminated zone is anticipated to extend no more than three feet above the soil/bedrock interface. One discrete, independent sample will be collected from each side-wall sampling area. The result of the one discrete sample will demonstrate that excavation at a particular side-wall segment is complete. Based on the anticipated dimensions of the excavation, a total of 23 confirmatory samples will be collected. This assumes approximately 230 linear feet of side wall and that there will be no west side wall to sample (excavation entrance). Side-wall samples will be collected by collecting from randomly-selected lateral and vertical positions within the side-wall sampling area using an Encore sampler or an equivalent method. Soil will be collected within three inches of the wall surface. The base of the excavation will be the bedrock surface, therefore no confirmation samples will be collected from the excavation floor. The spacing for sample collection is presented in Figure 2.

If for some reason the excavation is not safe to enter, the backhoe operator will be directed to skim the uppermost three inches of soil along a path that extends across the grid area. The excavation side-wall sample will then be collected directly from the backhoe bucket. Soil collected will be placed directly into the sample jar.

If supplemental excavation is necessary following the receipt of confirmation sampling results, one discrete, independent confirmation side-wall sample will be collected from each over-excavated side-wall segment according to the procedures outlined above.

2.4 Stockpile Sampling

A minimum of three discrete, independent samples will be collected from each of the anticipated three non-impacted stockpiles and analyzed for VOCs prior to reuse as backfill. Each sample will be collected from randomly selected locations from a depth of at least one foot below the stockpile surface. In accordance with the disposal facilities requirements, one composite sample will be collected from the impacted stockpile for disposal characterization prior to hauling off-site for disposal. Disposal characterization soil samples will be collected from the impacted soil stockpile using procedures outlined below:

From the stockpile, five equal aliquots of soil will be collected (approximately one aliquot for every 100 CY of soil). Each aliquot will be collected from randomly selected locations from a depth of at least one foot below the stockpile surface. One soil sample collection jar will be filled from equal portion of the five aliquots. The soil will not be homogenized prior to transfer to the soil sample jars for VOC analysis.

2.5 Disposal of Impacted Soil

It is anticipated that approximately 450 cubic yards of impacted material will be disposed off-site at the Superior Maple Hill Landfill in Macon, Missouri. Any non-impacted construction debris, such as asphalt, fencing that cannot be reused, etc., will be disposed at the nearest municipal or construction debris landfill. Hauling manifests for off-site disposal of the impacted material will be signed by a Modine representative. All relevant disposal and transportation documentation will be provided to MDNR as an attachment to the Summary Report prepared for Modine.

2.6 Site Restoration

The excavation will be backfilled to grade and compacted in lifts no greater than one foot thick using the non-impacted soil stockpile. Clean backfill material will be imported to compensate for the volume of impacted soil removed.

Approximately 50 to 60 feet of 16-inch diameter storm sewer line located within the excavation area will replaced with new galvanized steel 16-inch diameter pipe, if the existing pipe can not be salvaged for re-use.

Surface conditions will be restored to their pre-excavation state. This will include the replacement of the asphalt parking surface and repair of approximately 70 feet of chain link fencing.

2.7 Project Report

Following completion of Corrective Action activities and receipt of final analytical reports from the laboratory, CH2M HILL will prepare a report that summarizes the excavation activities and results. The report will consist of a discussion of the excavation activities, laboratory analytical results from the confirmation and characterization sampling, and our conclusions. Field documentation, photographs, hauling manifests, and laboratory reports will be included as attachments or appendices. A figure will also be included that depicts the limits of the excavation and the location of confirmatory samples.

3.0 Sample Handling and Laboratory Analysis

This section is designed to provide direction with regard to sample handling and laboratory analysis during the Corrective Action at Modine.

3.1 Sampling Equipment Decontamination Procedures

All equipment that may directly or indirectly contact samples will be decontaminated in a designated decontamination area. Accumulated decontamination water will be disposed via the on-site Modine wastewater treatment system.

For hand-held sampling devices, the following procedure will be used to decontaminate the equipment. The equipment will be scrubbed with a solution of potable water and Alconox, or equivalent laboratory-grade detergent. The equipment will then be rinsed with copious quantities of potable water followed by a ASTM Type II Reagent Water.

If the backhoe is used for sample collection, the following procedure will be used to decontaminate large pieces of equipment. The external surfaces of equipment will be washed with high-pressure hot water wash and if necessary, scrubbed until all visible dirt, grease, oil, etc., have been removed. The equipment will then be rinsed with potable water.

3.2 Sample Management Procedures

During the Corrective Action, a consistent sample identification system will be employed to ensure uniqueness and clarity in sample names. Side wall samples will be designated as follows – the sample from the second side-wall sampling area from the south wall of the excavation will be labeled MO-SW-02 (MO-Modine, SW-South Wall, 02 – Second Side-Wall Sampling Area). Stock pile sample for characterization will be labeled in a similar fashion, MO-SP-04 (MO-Modine, SP-Stockpile, 04 – Fourth Pile).

Procedures to ensure the custody and integrity of the samples begin at the time of sampling and continue through transport, sample receipt, preparation, analysis and storage, data generation and reporting, and sample disposal. Records concerning the custody and condition of the samples are maintained in field and laboratory records. Chain-of-custody records will be maintained for all field and field QC samples. All sample containers will be sealed in a manner that will prevent or detect tampering if it occurs.

3.3 Laboratory Analysis

Soil samples will be submitted to an off-site laboratory for VOC analyses (Method 8260). Test America has been tentatively selected as the analytical laboratory; however, the selection of the analytical laboratory will be based on the laboratory's ability to provide the requested 24-hour turn around time (TAT). The rapid TAT will expedite excavation

activities and avoid idle downtime or a remobilization if additional excavation is necessary to achieve the RACGs.

Samples will be shipped to the analytical laboratory on a daily basis. This will allow for the analytical results to be received within 48-hours of sample collection (one day for shipment and one day for analysis).

3.4 Quality Control Samples

Quality Control (QC) samples will be collected during the sampling portion of the Corrective Action to evaluate precision and bias during field activities and subsequent laboratory analysis. QC samples will consist of field duplicates and trip blanks.

3.1.1 Field Duplicates

A field duplicate sample is a second sample collected at the same location as the original sample. Duplicate samples are collected simultaneously or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. A field duplicate will be collected at a frequency of approximately 10 percent. Based on the dimensions of the proposed excavation, we anticipate collection of 23 confirmatory samples and 4 samples from the soil stockpiles. Therefore, we anticipate that one duplicate sample will be collected with the stockpile samples and three with the confirmatory samples.

3.1.2 Trip Blanks

The trip blank consists of a VOC sample vial filled in the laboratory with ASTM Type II reagent grade water, transported to the sampling site, handled like an environmental sample and returned to the laboratory for analysis. Trip blanks are not opened in the field. Trip blanks are prepared only when VOC samples are taken and are analyzed only for VOC analytes. Trip blanks are used to assess the potential introduction of contaminants from sample containers or during the transportation and storage procedures. One trip blank will accompany each cooler of samples sent to the laboratory for analysis of VOCs. Therefore, we expect that five trip blanks will be required, one for each day of excavation activities.

3.5 Quality Assurance Project Plan (QAPP)

To provide continuity with data collected during the previous activities at the site, the QAPP from Dames and Moore's *RCRA Facility Investigation Work Plan, Modine Manufacturing Company, Camdenton, Missouri* (Dames and Moore, 1999) will be used for this investigation.

4.0 Project Schedule

The Project Schedule, summarized below, assumes that field activities will not be interrupted by inclement weather or other unforeseeable delays.

Mobilization to the field will occur within two weeks of receipt of approval of this Work Plan form the MDNR.

Field activities are anticipated to be completed in nine working days or approximately two weeks. The excavation and stockpiling activities are anticipated to be completed with five days and the hauling and disposal activities and additional three to four days.

Corrective Action Summary Report will be submitted to the MDNR within three weeks of completion of the corrective action activities.

Assuming there are no delays, the total time required from commencement of the work through submittal of the Corrective Action Summary Report will be approximately seven weeks.

5.0 Project Organization

This corrective action project will be coordinated by Modine. The Modine individuals directly involved with the management of the project will be Mr. Thomas Sanicola, an environmental engineer with Modine's corporate office in Racine, Wisconsin and Mr. Bob King, the Quality/ Environmental Manager with the Modine facility in Camdenton, Missouri. Modine has selected CH2M HILL as the consultant for the project. CH2M HILL Constructors, Inc. (CCI) will serve as the general contractor for the work.

5.1 CH2M HILL Team

CH2M HILL roles and responsibilities have been identified for excavation activities at Modine Manufacturing Facility and are presented below:

The Project Manager will be Mr. Dan Price. Mr. Price has been involved with the activities at the site since 1995. He has approximately 15 years experience in the environmental industry and is a Registered Geologist in the State of Missouri. Mr. Price has managed several removal action projects similar to this one being implemented at the Modine facility.

CCI will provide a qualified individual experienced in conducting environmental dig and haul projects for Construction Oversight. This individual will be responsible for directing the excavation subcontractor, soil screening, collection of confirmatory and stockpile soil samples, and communication with the on-site Modine representative and the Project Manager.

5.2 Subcontractors

Modine and CH2M HILL have selected the following subcontractors to assist in completing this project.

Bellon Environmental Company of St. Louis, Missouri has been selected as the excavation contractor. Bellon personnel assigned to the project will have the appropriate health & safety training (HAZWOPPER) and experience in conducting environmental excavations. Bellon will be responsible for excavation and stockpiling of the removed soil, transportation of the impacted soil to an appropriately permitted landfill, and site restoration.

Superior Maple Hill Landfill in Macon, Missouri has been selected as the disposal facility to accept the approximately 450 cubic yards of impacted soil requiring off-site disposal.

Test America located in Nashville, Tennessee has tentatively been selected as the off-site analytical testing laboratory. Samples will be delivered to 2960 Foster Creighton Drive, Nashville, Tennessee 37204. Their ability to perform the required 24-hour TAT will be verified at the time the project is scheduled to begin.

6.0 References

CH2M HILL, 2000. Modine Manufacturing – Camdenton October 2000 Investigation Results, October 31, 2000.

CH2M HILL, 2000. Modine Manufacturing – Camdenton December 2000 Investigation Results, January 25, 2001.

Dames & Moore, 1996. Findings of an Investigation to Achieve Final Closure of the Interim TSD Facility Located at the Modine Heat Transfer, Inc. Site, Camdenton, Missouri, February 12, 1996.

U.S. Environmental Protection Agency. 1990. Corrective Action for Solid Wasted Management Units (SWMUs) at Hazardous Waste Management Facilities. 55 FR 30798, 40 CFR Part 264 (FRL-3403-8; EPA/OSW-FR-90-012), RIN 2050-AB42. Published by The Bureau of National Affairs, Inc., Washington, D.C. August 3, 1990.

U.S. Environmental Protection Agency. 1989. Development of an RFI Work Plan and General Considerations for RCRA Facility Investigations. Interim Final, RCRA Facility Investigation (RFI) Guidance, Volume I of IV. OWSER Directive 9502.00-6, EPA 530/SW-89-031. Waste Management Division, Office of Solid Waste. May 1989.

Figures

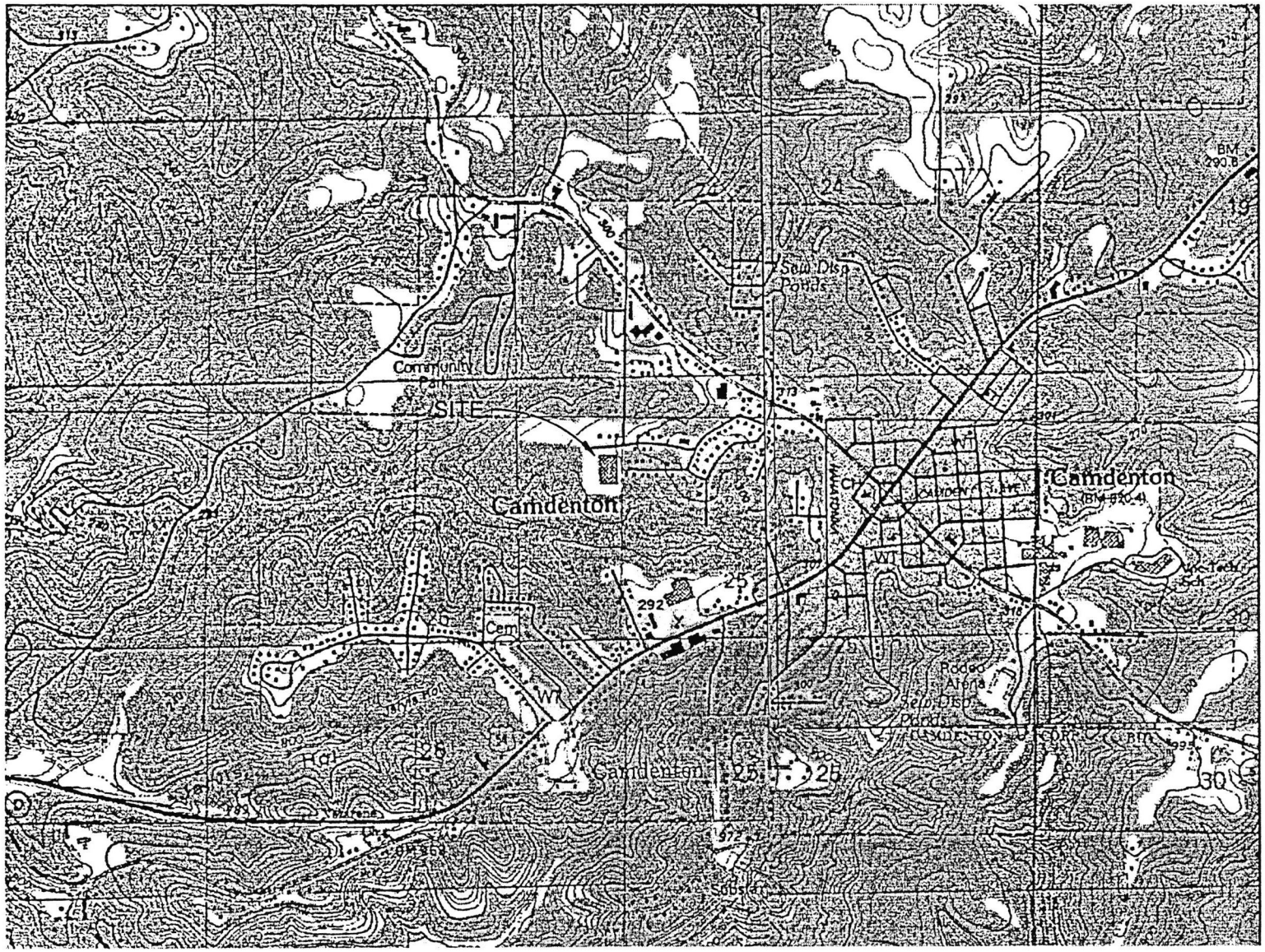

FIGURE 1
SITE LOCATION MAP
MODINE MANUFACTURING COMPANY
CAMDENTON, MISSOURI
SEPTEMBER, 2001

CH2MHILL

/lacleda/proj/161004/cadd/figure01.dlv

N

0 40 80 120
Scale In Feet

SUNSET DRIVE

ASPHALT

ASPHALT

40 ACRES BRUSH COVERED FIELD

APPROXIMATE LOCATION
OF EXCAVATION AREA

APPROXIMATE LOCATION
OF IMPACTED SOIL STOCKPILE

APPROXIMATE LOCATION
OF NON-IMPACTED SOIL STOCKPILES

MODINE
MANUFACTURING COMPANY
CAMDENTON PLANT

GRAVEL

CONCRETE

ASPHALT

SERVICE ROAD

LEGEND

- PROPERTY BOUNDARY
- FENCE
- APPROXIMATE EXCAVATION AREA
- SIDE-WALL SAMPLING AREA LOCATION

FIGURE 2
APPROXIMATE EXCAVATION AREA
MODINE MANUFACTURING COMPANY
SEPTEMBER, 2001

CH2MHILL

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Attachment 1

Health and Safety Plan

CH2M HILL HEALTH AND SAFETY PLAN

This Health and Safety Plan (HSP) will be kept on the site during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. The plan adopts, by reference, the Standards of Practice (SOPs) in the CH2M HILL *Corporate Health and Safety Program, Program and Training Manual*, and the Dames & Moore Modine site health and safety plan, as appropriate. In addition, this plan adopts procedures in the project Work Plan. The Site Safety Coordinator (SSC) is to be familiar with these SOPs and the contents of this plan. CH2M HILL's personnel and subcontractors must sign Attachment 1.

Project Information and Description

PROJECT NO: 161004

CLIENT: Modine Manufacturing Company

PROJECT/SITE NAME: Modine Manufacturing Company

SITE ADDRESS: 179 Sunset Drive, Camdenton, Missouri

CH2M HILL PROJECT MANAGER: Price, Dan

CH2M HILL OFFICE: St. Louis

DATE HEALTH AND SAFETY PLAN PREPARED AND UPDATED: 9/29/00 and 7/23/01

DATE(S) OF SITE WORK: August 2001

SITE DESCRIPTION AND HISTORY: Refer to Dames & Moore Site-Specific Health and Safety Plan for project site details.

DESCRIPTION OF SPECIFIC TASKS TO BE PERFORMED: Groundwater sampling and soil borings via direct push. Excavation oversight and confirmatory sampling.

1 Tasks to be Performed Under this Plan

1.1 Description of Tasks

(Reference Field Project Start-up Form)

Refer to project documents (i.e., Work Plan) for detailed task information. A health and safety risk analysis (Section 1.2) has been performed for each task and is incorporated in this plan through task-specific hazard controls and requirements for monitoring and protection. Tasks other than those listed below require an approved amendment or revision to this plan before tasks begin. Refer to Section 8.2 for procedures related to "clean" tasks that do not involve hazardous waste operations and emergency response (Hazwoper).

1.1.1 Hazwoper-Regulated Tasks

- Geoprobe boring
- Groundwater monitoring
- Test pit excavation
- Observation of material loading for offsite disposal
- Surface soil sampling

1.2 Task Hazard Analysis

(Refer to Section 2 for hazard controls)

POTENTIAL HAZARDS	TASKS					
	Test pit/ excavation	Drilling, geoprobe, and well installation & abandonment	Groundwater monitoring, aquifer testing	Surface water and sediment sampling from the shore or water	Observation of loading material for offsite disposal	Remediation & construction oversight
Flying debris/objects	X	X		X	X	X
Noise > 85dBA	X	X			X	X
Electrical	X	X	X			X
Suspended loads	X	X			X	X
Buried utilities, drums, tanks	X	X				X
Slip, trip, fall	X	X	X	X	X	X
Back injury	X	X	X	X		X
Confined space entry	X					X
Trenches / excavations	X					X
Visible lightning	X	X	X	X	X	X
Vehicle traffic					X	X
Elevated work areas/falls	X			X		X
Fires	X	X		X		X
Entanglement		X				
Drilling		X				
Heavy equipment	X	X			X	X
Working near water				X		
Working from boat						
IDW Drum Sampling						

2 Hazard Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of either the site or the particular hazard. CH2M HILL employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. CH2M HILL employees and subcontractors who do not understand any of these provisions should contact the SSC for clarification.

In addition to the controls specified in this section, Project-Activity Self-Assessment Checklists are contained in Attachment 6. These checklists are to be used to assess the adequacy of CH2M HILL and subcontractor site-specific safety requirements. The objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in addressing these gaps. Self-assessment checklists should be completed early in the project, when tasks or conditions change, or when otherwise specified by the HSM. The self-assessment checklists, including documented corrective actions, should be made part of the permanent project records, and be promptly submitted to the HSM.

Project-specific frequency for completing self-assessments: At least once during drilling. Note that some of the drilling assessment checklist items will not apply to direct-push rigs.

2.1 Project-Specific Hazards

2.1.1 Lead

The following requirements pertain to lead contaminated soils:

- Water should be added to soils prior to and during excavation, air rotary drilling, and other activities that create or have the potential to create airborne lead contaminated dust. For air rotary drilling operations, water can be added to the boring to reduce dust generation from the cyclone. Depending upon soil type, watering of soil may be required several days prior to commencing ground intrusive activities.
- Personnel working in the vicinity of lead contaminated soil shall wear disposable coveralls or equal and exercise enhanced personal hygiene (i.e., frequent hand washing prior to eating, drinking, and smoking; separation of work and street clothing/footwear; etc.).

2.1.2 Drilling

(Reference CH2M HILL SOP HS-35, *Drilling*)

- Only authorized personnel are permitted to operate drill rigs.
- Stay clear of areas surrounding drill rigs during every startup.
- Stay clear of the rotating augers and other rotating components of drill rigs.
- Stay as clear as possible of all hoisting operations. Loads shall not be hoisted overhead of personnel.
- Do not wear loose-fitting clothing or other items such as rings or watches that could get caught in moving parts. Long hair should have it restrained.
- If equipment becomes electrically energized, personnel shall be instructed not to touch any part of the equipment or attempt to touch any person who may be in contact with the electrical current. The utility company or appropriate party shall be contacted to have line de-energized prior to approaching the equipment.
- Smoking around drilling operations is prohibited.

2.1.3 Excavation (Reference CH2M HILL SOP HS-32, *Excavations*)

- Do not enter the excavations unless completely necessary, and only after the competent person has completed the daily inspection and has authorized entry.
- Follow all excavation entry requirements established by the competent person.
- Do not enter excavations where protective systems are damaged or unstable.
- Do not enter excavations where objects or structures above the work location may become unstable and fall into the excavation.
- Do not enter excavations with the potential for a hazardous atmosphere until the air has been tested and found to be at safe levels.
- Do not enter excavations with accumulated water unless precautions have been taken to prevent excavation cave-in.

- H&S Self-Assessment Checklist – Excavations, found in Attachment 5 of this plan, should be used to evaluate excavations prior to entry.

2.2 General Hazards

2.2.2 Hazard Communication

(Reference CH2M HILL SOP HS-05, *Hazard Communication)*

The SSC is to perform the following:

- Complete an inventory of chemicals brought on site by CH2M HILL using Attachment 2.
- Confirm that an inventory of chemicals brought on site by CH2M HILL subcontractors is available.
- Request or confirm locations of Material Safety Data Sheets (MSDSs) from the client, contractors, and subcontractors for chemicals to which CH2M HILL employees potentially are exposed.
- Before or as the chemicals arrive on site, obtain an MSDS for each hazardous chemical.
- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly.
- Give employees required chemical-specific HAZCOM training using Attachment 3.
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

2.2.3 Shipping and Transportation of Chemical Products

(Reference CH2M HILL's *Procedures for Shipping and Transporting Dangerous Goods)*

Chemicals brought to the site might be defined as hazardous materials by the U.S. Department of Transportation (DOT). All staff who ship the materials or transport them by road must receive CH2M HILL training in shipping dangerous goods. All hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the HSM or the Equipment Coordinator for additional information.

2.2.4 Lifting

(Reference CH2M HILL SOP HS-29, *Lifting*)

- Proper lifting techniques must be used when lifting any object.
  - Plan storage and staging to minimize lifting or carrying distances.
  - Split heavy loads into smaller loads.
  - Use mechanical lifting aids whenever possible.
  - Have someone assist with the lift -- especially for heavy or awkward loads.
  - Make sure the path of travel is clear prior to the lift.

2.2.5 Fire Prevention

(Reference CH2M HILL SOP HS-22, *Fire Prevention*)

- Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 feet. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet. Extinguishers must:
  - be maintained in a fully charged and operable condition,
  - be visually inspected each month, and
  - undergo a maintenance check each year.
- The area in front of extinguishers must be kept clear.
- Combustible materials stored outside should be at least 10 feet from any building.
- Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site.
- Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

2.2.6 Electrical

(Reference CH2M HILL SOP HS-23, *Electrical*)

- Only qualified personnel are permitted to work on unprotected energized electrical systems.
- Only authorized personnel are permitted to enter high-voltage areas.
- Do not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lockout/tagout procedures are implemented.

- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment, remove from service.
- All temporary wiring, including extension cords and electrical power tools, must have ground fault circuit interrupters (GFCIs) installed.
- Extension cords must be:
  - equipped with third-wire grounding.
  - covered, elevated, or protected from damage when passing through work areas.
  - protected from pinching if routed through doorways.
  - not fastened with staples, hung from nails, or suspended with wire.
- Electrical power tools and equipment must be effectively grounded or double-insulated UL approved.
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.
- Maintain safe clearance distances between overhead power lines and any electrical conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet from overhead power lines for voltages of 50 kV or less, and 10 feet plus ½ inch for every 1 kV over 50 kV.
- Temporary lights shall not be suspended by their electric cord unless designed for suspension. Lights shall be protected from accidental contact or breakage.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

2.2.10 Procedures for Locating Buried Utilities

Local Utility Mark-Out Service

Name: Don Mans of Modine Manufacturing Company
Phone: 573-346-5693

- Where available, obtain utility diagrams for the facility.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from utility mark-out service.
- Where necessary (e.g., uncertainty about utility locations), excavation or drilling of the upper depth interval should be performed manually
- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change n advancement of auger or split spoon).
- When the client or other onsite party is responsible for determining the presence and locations of buried utilities, the SSC should confirm that arrangement.

2.2.11 Confined Space Entry

(Reference CH2M HILL SOP HS-17, *Confined Space Entry*)

No confined space entry will be permitted. Confined space entry requires additional health and safety procedures, training, and a permit. If conditions change such that confined-space entry is necessary, contact the HSM to develop the required entry permit.

When planned activities will not include confined-space entry, permit-required confined spaces accessible to CH2M HILL personnel are to be identified before the task begins. The SSC is to confirm that permit spaces are properly posted or that employees are informed of their locations and hazards.

2.3 Biological Hazards and Controls

2.3.1 Snakes

Snakes typically are found in underbrush and tall grassy areas. If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. **DO NOT** apply ice, cut the wound, or apply a tourniquet. Try to identify the type of snake: note color, size, patterns, and markings.

2.3.2 Poison Ivy and Poison Sumac

Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas. Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.

2.3.3 Ticks

Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown and can be up to one-quarter inch in size. Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into boots; spray **only outside** of clothing with permethrin or permanone and spray skin with only DEET; and check yourself frequently for ticks.

If bitten by a tick, grasp it at the point of attachment and carefully remove it. After removing the tick, wash your hands and disinfect and press the bite areas. Save the removed tick. Report the bite to human resources. Look for symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF). Lyme: a rash might appear that looks like a bullseye with a small welt in the center. RMSF: a rash of red spots under the skin 3 to 10 days after the tick bite. In both cases, chills, fever, headache, fatigue, stiff neck, and bone pain may develop. If symptoms appear, seek medical attention.

2.3.4 Bees and Other Stinging Insects

Bee and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic. Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past, and inform the SSC and/or buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.

2.3.5 Bloodborne Pathogens

(Reference CH2M HILL SOP HS-36, *Bloodborne Pathogens*)

Exposure to bloodborne pathogens may occur when rendering first aid or CPR, or when coming into contact with landfill waste or waste streams containing potentially infectious material. Exposure controls and personal protective equipment (PPE) are required as specified in CH2M HILL SOP HS-36, *Bloodborne Pathogens*. Hepatitis B vaccination must be offered before the person participates in a task where exposure is a possibility.

2.5 Contaminants of Concern

(Refer to Project Files for more detailed contaminant information)

Contaminant	Location and Maximum[a] Concentration (ppm)	Exposure Limit[b]	IDLH[c]	Symptoms and Effects of Exposure	PIP[d] (eV)
Lead	GW: 0.044 SB: 1,400 SS:	0.05 mg/m^3	100	Weakness lassitude, facial pallor, pal eye, weight loss, malnutrition, abdominal pain, constipation, anemia, gingival lead line, tremors, paralysis of wrist and ankles, encephalopathy, kidney disease, irritated eyes, hypertension	NA
Methylene Chloride	SB: 0.03	25 ppm	2,300 Ca	Irritation of the eyes and skin; fatigue; weakness; somnolence; light-headedness; numb, tingling limbs; nausea	11.32
Methyl Chloroform	SB: 200	350 ppm	700	Central nervous system (CNS) depression, poor equilibrium; headache, eye and skin irritation; dermatitis; liver injury; cardiac arrhythmia.	11.00
1,1,2-Trichloroethane	GW: SB: 0.099 SS:	10 ppm	100 Ca	Eye and nose irritation, CNS depression, liver damage, dermatitis	11.00
Trichloroethylene (TCE)	GW: 0.467 SB: 3 SS:	50 ppm	1,000 Ca	Headache, vertigo, visual disturbance, eye and skin irritation, fatigue, giddiness, tremors, sleepiness, nausea, vomiting, dermatitis, cardiac arrhythmia, paresthesia, liver injury	9.45
Toluene	GW: SB: 0.027 SS:	50 ppm	500	Eye and nose irritation, fatigue, weakness, confusion, dizziness, headache, dilated pupils, excessive tearing, nervousness, muscle fatigue, paresthesia, dermatitis, liver and kidney damage	8.82
Xylenes	GW: SB: 0.015 SS:	100 ppm	900	Irritated eyes, skin, nose, and throat; dizziness; excitement; drowsiness; incoherence; staggering gait; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; dermatitis	8.56
Vinyl Chloride	GW: SB: 12 SS:	1 ppm	NL Ca	Weakness, abdominal pain, gastrointestinal bleeding, enlarged liver, pallor or cyanosis of extremities	9.99

Footnotes:

[a] Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), S (Surface Soil), SL (Sludge), SW (Surface Water).

[b] Appropriate value of PEL, REL, or TLV listed.

[c] IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.

[d] PIP = photoionization potential; NA = Not applicable; UK = Unknown.

2.6 Potential Routes of Exposure

Dermal: Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section 4.	**Inhalation:** Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections 4 and 5, respectively.	**Other:** Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).

3 Project Organization and Personnel

3.1 CH2M HILL Employee Medical Surveillance and Training

(Reference CH2M HILL SOPs HS-01, *Medical Surveillance,* and HS-02, *Health and Safety Training)*

The employees listed below are enrolled in the CH2M HILL Comprehensive Health and Safety Program and meet state and federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated "SSC" have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SSC with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones. The employees listed below are currently active in a medical surveillance program that meets state and federal regulatory requirements for hazardous waste operations. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Pregnant employees are to be informed of and are to follow the procedures in CH2M HILL's SOP HS-04, *Reproduction Protection*, including obtaining a physician's statement of the employee's ability to perform hazardous activities before being assigned fieldwork.

Employee Name	Office	Responsibility	SSC/FA-CPR
Julie Mottin	STL	SSC; Field Team Leader	Level C SSC; FA-CPR

3.2 Field Team Chain of Command and Communication Procedures

3.2.1 Client

Contact Name: Tom Sanicola
Phone:262-636-1649
Facility Contact Name: Bob King
Phone:573-346-5693

3.2.2 CH2M HILL

Project Manager: Dan Price/STL
Health and Safety Manager: John Longo/NJO
Field Team Leader: Julie Mottin/STL
Site Safety Coordinator: Julie Mottin/STL
The SSC is responsible for contacting the Field Team Leader and Project Manager. In general, the Project Manager will contact the client. The Health and Safety Manager should be contacted as appropriate.

3.2.3 CH2M HILL Subcontractors

(Reference CH2M HILL SOP HS-55, *Subcontractor, Contractor, and Owner*)

Subcontractor: Geotechnology (To be confirmed at a later date)
Subcontractor Contact Name: James Howe
Telephone: 314/997-7440

Subcontractor: Bellon Environmental (To be confirmed at a later date)
Subcontractor Contact Name: John Northington
Telephone: 314/890-8600

The subcontractors listed above are covered by this HSP and must be provided a copy of this plan. However, this plan does not address hazards associated with the tasks and equipment that the subcontractor has expertise in (e.g., drilling, excavation work, electrical). Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit these procedures to CH2M HILL for review before the start of field work. Subcontractors must comply with the established health and safety plan(s). The CH2M HILL SSC should verify that subcontractor

employee training, medical clearance, and fit test records are current and must monitor and enforce compliance with the established plan(s). CH2M HILL's oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

CH2M HILL should continuously endeavor to observe subcontractors' safety performance. This endeavor should be reasonable, and include observing for hazards or unsafe practices that are both readily observable and occur in common work areas. CH2M HILL is not responsible for exhaustive observation for hazards and unsafe practices. In addition to this level of observation, the SSC is responsible for confirming CH2M HILL subcontractor performance against both the subcontractor's safety plan and applicable self-assessment checklists. Self-assessment checklists contained in Attachment 6 are to be used by the SSC to review subcontractor performance.

Health and safety related communications with CH2M HILL subcontractors should be conducted as follows:

- Brief subcontractors on the provisions of this plan, and require them to sign the Employee Signoff Form included in Attachment 1.
- Request subcontractor(s) to brief the project team on the hazards and precautions related to their work.
- When apparent non-compliance/unsafe conditions or practices are observed, notify the subcontractor safety representative and require corrective action – the subcontractor is responsible for determining and implementing necessary controls and corrective actions.
- When repeat non-compliance/unsafe conditions are observed, notify the subcontractor safety representative and stop affected work until adequate corrective measures are implemented.
- When an apparent imminent danger exists, immediately remove all affected CH2M HILL employees and subcontractors, notify subcontractor safety representative, and stop affected work until adequate corrective measures are implemented. Notify the Project Manager and HSM as appropriate.
- Document all oral health and safety related communications in project field logbook, daily reports, or other records.

3.2.4 Contractors

(Reference CH2M HILL SOP HS-55, *Subcontractor, Contractor, and Owner*)

Contractor: Dames & Moore
Contractor Contact Name: Refer to D&M plan
Telephone: Refer to D&M Plan

This plan does not cover contractors that are contracted directly to the client or the owner. CH2M HILL is not responsible for the health and safety or means and methods of the contractor's work, and we must never assume such responsibility through our actions (e.g., advising on H&S issues). In addition to this plan, CH2M HILL staff should review contractor safety plans so that we remain aware of appropriate precautions that apply to us. Except in unusual situations when conducted by the HSM, CH2M HILL must never comment on or approve contractor safety procedures. Self-assessment checklists contained in Attachment 6 are to be used by the SSC to review the contractor's performance ONLY as it pertains to evaluating our exposure and safety.

Health and safety related communications with contractors should be conducted as follows:

- Request the contractor to brief CH2M HILL employees and subcontractors on the precautions related to the contractor's work.
- When an apparent contractor non-compliance/unsafe condition or practice poses a risk to CH2M HILL employees or subcontractors:
  - Notify the contractor safety representative
  - Request that the contractor determine and implement corrective actions
  - If needed, stop affected CH2M HILL work until contractor corrects the condition or practice. Notify the client, Project Manager, and HSM as appropriate.
- If apparent contractor non-compliance/unsafe conditions or practices are observed, inform the contractor safety representative. Our obligation is limited strictly to informing the contractor of our observation – the contractor is solely responsible for determining and implementing necessary controls and corrective actions.
- If an apparent imminent danger is observed, immediately warn the contractor employee(s) in danger and notify the contractor safety representative. Our obligation is limited strictly to immediately warning the affected individual(s) and informing the contractor of our observation – the contractor is solely responsible for determining and implementing necessary controls and corrective actions.
- Document all oral health and safety related communications in project field logbook, daily reports, or other records.

4 Personal Protective Equipment (PPE)

(Reference CH2M HILL SOP HS-07, *Personal Protective Equipment*, HS-08, *Respiratory Protection*)

PPE Specifications [a]

Task	Level	Body	Head	Respirator [b]
General site entry Surveying Observation of material loading for offsite disposal Oversight of remediation and construction	D	Work clothes; steel-toe, leather work boots; work glove.	Hardhat [c] Safety glasses Ear protection [d]	None required
Geoprobe boring	Modified D	Work clothes or cotton coveralls **Boots:** Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat [c] Safety glasses Ear protection [d]	None required
Groundwater sampling Excavation Oversight Confirmation Sampling	Modified D	**Coveralls:** Uncoated Tyvek® **Boots:** Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat [c] Splash shield [c] Safety glasses Ear protection [d]	None required.
Tasks requiring upgrade	C	**Coveralls:** Polycoated Tyvek® **Boots:** Steel-toe, chemical-resistant boots OR steel-toe, leather work boots with outer rubber boot covers **Gloves:** Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat [c] Splash shield [c] Ear protection [d] Spectacle inserts	APR, full face, MSA Ultratwin or equivalent; with GME-H cartridges or equivalent[e].

Note: Nitrile gloves offer only very limited protection against site contaminants, and are adequate only when site contaminants are present in extremely dilute (ppm-range) concentrations.

Reasons for Upgrading or Downgrading Level of Protection

Upgrade[f]	Downgrade
• Request from individual performing tasks. • Change in work tasks that will increase contact or potential contact with hazardous materials. • Occurrence or likely occurrence of gas or vapor emission. • Known or suspected presence of dermal hazards. • Instrument action levels (Section 5) exceeded.	• New information indicating that situation is less hazardous than originally thought. • Change in site conditions that decreases the hazard. • Change in work task that will reduce contact with hazardous materials.

[a] Modifications are as indicated. CH2M HILL will provide PPE only to CH2M HILL employees.

[b] No facial hair that would interfere with respirator fit is permitted.

[c] Hardhat and splash-shield areas are to be determined by the SSC.

[d] Ear protection should be worn when conversations cannot be held at distances of 3 feet or less without shouting.

[e] Cartridge change-out schedule is at least every 8 hours (or one work day), except if relative humidity is > 85%, or if organic vapor measurements are > midpoint of Level C range (refer to Section 5)--then at least every 4 hours. If encountered conditions are different than those anticipated in this HSP, contact the HSM.

[f] Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the HSM, and an SSC qualified at that level is present.

5 Air Monitoring Specifications

(Reference CH2M HILL SOP HS-06, *Air Monitoring)*

Instrument	Tasks	Action Levels[a]		Frequency [b]	Calibration
PID: OVM with 10.6eV lamp or equivalent	Soil borings	0-5 ppm 5-50 ppm	Level D Level C	Initially and periodically during task	Daily
	Groundwater sampling	>50 ppm	Level B		
	Test pit excavation				
Colormetric Tube: Drager vinyl chloride specific (0.5 to 30 ppm range) with pre-tube, or equivalent	All tasks listed above if PID/FID readings > 1 ppm	<0.5 ppm ≥0.5 ppm	Level D Level B	Initially and periodically when PID/FID >1 ppm	Not applicable

[a] Action levels apply to sustained breathing-zone measurements above background.

[b] The exact frequency of monitoring depends on field conditions and is to be determined by the SSC; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).

Calibration Specifications

(Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures)

Instrument	Gas	Span	Reading	Method
PID: OVM, 10.6 or 11.8 eV bulb	100 ppm isobutylene	RF = 1.0	100 ppm	1.5 lpm reg T-tubing
PID: MiniRAE, 10.6 eV bulb	100 ppm isobutylene	CF = 100	100 ppm	1.5 lpm reg T-tubing

6 Decontamination

(Reference CH2M HILL SOP HS-13, *Decontamination*)

The SSC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the SSC. The SSC must ensure that procedures are established for disposing of materials generated on the site. Refer to the Dames & Moore plan for specific details.

8 Site-Control Plan

8.1 Site-Control Procedures

(Reference CH2M HILL SOP HS-11, *Site Control)*

- The SSC will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for briefing on site safety: general discussion of Health and Safety Plan, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, emergencies.
- The SSC records attendance at safety briefings in a logbook and documents the topics discussed.
- Establish support, decontamination, and exclusion zones. Delineate with flags or cones as appropriate. Support zone should be upwind of the site. Use access control at entry and exit from each work zone.
- Establish onsite communication consisting of the following:
  - Line-of-sight and hand signals
  - Air horn
  - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the "buddy system."
- Initial air monitoring is conducted by the SSC in appropriate level of protection.

- The SCC is to conduct periodic inspections of work practices to determine the effectiveness of this plan – refer to Sections 2 and 3. Deficiencies are to be noted, reported to the HSM, and corrected.

9 Emergency Response Plan

(Reference CH2M HILL, SOP HS-12, *Emergency Response*)

9.1 Pre-Emergency Planning

The SSC performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with CH2M HILL onsite parties, the facility, and local emergency-service providers as appropriate.

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Field Trailers: Post "Exit" signs above exit doors, and post "Fire Extinguisher" signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Brief new workers on the emergency response plan.

The SSC will evaluate emergency response actions and initiate appropriate follow-up actions.

9.2 Emergency Equipment and Supplies

The SSC should mark the locations of emergency equipment on the site map and post the map.

Emergency Equipment and Supplies	Location
20 LB (or two 10-lb) fire extinguisher (A, B, and C classes)	Support Zone/Heavy Equipment
First aid kit	Support Zone/Field Vehicle
Eye Wash	Support & Decon Zone/Field Vehicle
Potable water	Support & Decon Zone/Field Vehicle
Bloodborne-pathogen kit	Support Zone/Field Vehicle
Additional equipment (specify):	Cell Phone

9.3 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down CH2M HILL operations and evacuate the immediate work area.
- Notify appropriate response personnel.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

9.4 Emergency Medical Treatment

The procedures listed below may also be applied to non-emergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the CH2M HILL medical consultant. During non-emergencies, follow these procedures as appropriate.

- Notify appropriate emergency response authorities listed in Section 9.8 (e.g., 911).
- The SCC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the emergency room.
- When contacting the medical consultant, state that the situation is a CH2M HILL matter, and give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.
- Report incident as outlined in Section 9.7.

9.5 Evacuation

- Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the SSC before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The SSC and a "buddy" will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The SSC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The SSC will write up the incident as soon as possible after it occurs and submit a report to the Corporate Director of Health and Safety.

9.6 Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

9.7 Incident Notification and Reporting

- Upon any project incident (fire, spill, injury, near miss, death, etc.), immediately notify the PM and HSM. Call emergency beeper number if HSM is unavailable.
- For CH2M HILL work-related injuries or illnesses, contact and help Human Resources administrator complete an Incident Report Form (IRF). IRF must be completed within 24 hours of incident.
- For CH2M HILL subcontractor incidents, complete the Subcontractor Accident/Illness Report Form and submit to the HSM.
- Notify and submit reports to client as required in contract.

10 Approval

This site-specific Health and Safety Plan has been written for use by CH2M HILL only. CH2M HILL claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if those conditions change.

10.1 Original Plan

Written/Approved By: John Longo/NJO **Date:** 9/30/2000

10.2 Revisions

Revisions Made By: Anne Bartin/STL Date: July 23, 2001

Revisions to Plan: Updated tasks and associated project-specific hazards and checklists, contaminants of concern data, CH2M HILL personnel, subcontractor, and emergency contacts information.

Revisions Approved By: Lisa D. Martin Date: July 23, 2001

11 Attachments

Attachment 1: **Project-Specific Chemical Product Hazard Communication Form**
Attachment 2: **Chemical-Specific Training Form**
Attachment 3: **Emergency Contacts**
Attachment 4: **Project Activity Self-Assessment Checklists**
Attachment 5: **Applicable Material Safety Data Sheets**

EMPLOYEE SIGNOFF FORM

Health and Safety Plan

- The CH2M HILL project employees and subcontractors listed below have been provided with a copy of this HSP, have read and understood it, and agree to abide by its provisions.

Project Name: Modine Manufacturing Company **Project Number:** 161004

EMPLOYEE NAME (Please print)	EMPLOYEE SIGNATURE	COMPANY	DATE
Julie Mottin			

CH2MHILL

Project-Specific Chemical Product Hazard Communication Form

This form must be completed prior to performing activities that expose personnel to hazardous chemicals products. Upon completion of this form, the SSC shall verify that training is provided on the hazards associated with these chemicals and the control measures to be used to prevent exposure to CH2M HILL and subcontractor personnel. Labeling and MSDS systems will also be explained.

Project Name: Modine Manufacturing Company **Project Number:** 161004

MSDSs will be maintained at the following location(s): With the CH2M HILL personnel on-site.

Hazardous Chemical Products Inventory

Chemical	Quantity	Location	MSDS Available	Container labels	
				Identity	Hazard
Isobutylene	1 liter, compressed	Support Zone			
Hydrochloric acid	< 500 ml	Support Zone / sample bottles			
Nitric acid	< 500 ml	Support Zone / sample bottles			
pH buffers	< 500 ml	Support Zone			

Refer to SOP HS-05 *Hazard Communication* for more detailed information.

CHEMICAL-SPECIFIC TRAINING FORM

Location: Project # : 161004.CA.01

HCC: Trainer:

TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

The HCC shall use the product MSDS to provide the following information concerning each of the products listed above.

- ☐ Physical and health hazards
- ☐ Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)
- ☐ Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

Training participants shall have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and CH2M HILL's written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

Emergency Contacts

24-hour CH2M HILL Emergency Beeper – 888/444-1226

Medical Emergency – 911
Local Ambulance #:

CH2M HILL Medical Consultant
Dr. Peter Greaney
GMG WorkCare, Orange, CA
800/455-6155
(After hours calls will be returned within 20 minutes)

Fire/Spill Emergency – 911

Local Occupational Physician
Barnes Care
401 Pine St.
St. Louis, 314/331-3000

Security & Police – 911

Corporate Director Health and Safety
Name: Dave McCormack/SEA
Phone: 206/453-5005
24-hour emergency beeper: 888-444-1226

Utilities Emergency
Water: 573-873-5041
Gas: 573-873-5041
Electric: 1-800-263-7303

Health and Safety Manager (HSM)
Name: John Longo/NJO
Phone: 973/316-9300
Cell Ph: 973/449-3587

Designated Safety Coordinator (DSC)
Name: Julie Mottin/STL
Phone: 314/421-0313

Regional Human Resources Department
Name: Shannon Loos/MKE
Phone: 414/272-1052

Project Manager
Name: Dan Price/STL
Phone: 314/421-0313

Corporate Human Resources Department
Name: John Monark/COR
Phone: 303/771-0900

Federal Express Dangerous Goods Shipping
Phone: 800/238-5355

CH2M HILL Emergency Number for Shipping Dangerous Goods
Phone: 800/255-3924

Worker's Compensation and Auto Claims
Sterling Administration Services
Phone: 800/420-8926 After hours: 800/497-4566

Report fatalities AND report vehicular accidents involving pedestrians, motorcycles, or more than two cars.

Contact the Project Manager. Generally, the Project Manager will contact relevant government agencies.

Facility Alarms: Refer to D&M plan

Evacuation Assembly Area(s): Refer to D&M plan

Facility/Site Evacuation Route(s): Refer to D&M plan

Hospital Name/Address: Lake of Ozarks General Hospital

Hospital Phone #: 573/348-3181

Directions to Hospital

Refer to the Dames & Moore Site Health and Safety Plan.

CH2MHILL

H&S Self-Assessment Checklist - DRILLING

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to hazards associated with drilling operations (complete Sections 1 and 3), and/or 2) CH2M HILL oversight of a drilling subcontractor is required (complete entire checklist).

SSC/DSC may consult with drilling subcontractors when completing this checklist, but shall not direct the means and methods of drilling operations nor direct the details of corrective actions. Drilling subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the health and safety manager for review.

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

☐ Evaluate CH2M HILL employee exposures to drilling hazards
☐ Evaluate a CH2M HILL subcontractor's compliance with drilling H&S requirements
Subcontractors Name: _____

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the drilling subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-35.

SECTION 1	Yes	No	N/A	N/O
PERSONNEL SAFE WORK PRACTICES (3.1)				
1. Only authorized personnel operating drill rig	☐	☐	☐	☐
2. Personnel cleared during rig startup	☐	☐	☐	☐
3. Personnel clear of rotating parts	☐	☐	☐	☐
4. Personnel not positioned under hoisted loads	☐	☐	☐	☐
5. Loose clothing and jewelry removed	☐	☐	☐	☐
6. Personnel instructed not to approach equipment that has become electrically energized	☐	☐	☐	☐
7. Smoking is prohibited around drilling operation	☐	☐	☐	☐
8. Personnel wearing appropriate PPE, per HSP/FSI	☐	☐	☐	☐

Rev.0

SECTION 2	Yes	No	N/A	N/O
GENERAL (3.2.1)				
9. Daily safety briefing/meeting conducted with crew	☐	☐	☐	☐
10. Daily inspection of drill rig and equipment conducted before use	☐	☐	☐	☐
DRILL RIG PLACEMENT (3.2.2)				
11. Location of underground utilities identified	☐	☐	☐	☐
12. Safe clearance distance maintained from overhead powerlines	☐	☐	☐	☐
13. Drilling pad established, when necessary	☐	☐	☐	☐
14. Drill rig leveled and stabilized	☐	☐	☐	☐
DRILL RIG TRAVEL (3.2.3)				
15. Rig shut down and mast lowered and secured prior to rig movement	☐	☐	☐	☐
16. Tools and equipment secured prior to rig movement	☐	☐	☐	☐
17. Only personnel seated in cab are riding on rig during movement	☐	☐	☐	☐
18. Safe clearance distance maintained while traveling under overhead powerlines	☐	☐	☐	☐
19. Backup alarm or spotter used when backing rig	☐	☐	☐	☐
DRILL RIG OPERATION (3.2.4)				
20. Kill switch clearly identified and operational	☐	☐	☐	☐
21. All machine guards are in place	☐	☐	☐	☐
22. Rig ropes not wrapped around body parts	☐	☐	☐	☐
23. Pressurized lines and hoses secured from whipping hazards	☐	☐	☐	☐
24. Drill operation stopped during inclement weather	☐	☐	☐	☐
25. Air monitoring conducted per HSP/FSI for hazardous atmospheres	☐	☐	☐	☐
26. Rig placed in neutral when operator not at controls	☐	☐	☐	☐
DRILL RIG MAINTENANCE (3.2.5)				
27. Defective components repaired immediately	☐	☐	☐	☐
28. Lockout/tagout procedures used prior to maintenance	☐	☐	☐	☐
29. Cathead in clean, sound condition	☐	☐	☐	☐
30. Drill rig ropes in clean, sound condition	☐	☐	☐	☐
31. Fall protection used for fall exposures of 6 feet or greater	☐	☐	☐	☐
32. Rig in neutral and augers stopped rotating before cleaning	☐	☐	☐	☐
33. Good housekeeping maintained on and around rig	☐	☐	☐	☐
DRILLING AT HAZARDOUS WASTE SITES (3.2.6)				
34. Waste disposed of according to HSP	☐	☐	☐	☐
35. Appropriate decontamination procedures being followed, per HSP	☐	☐	☐	☐

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SECTION 3

Complete this section for all items checked "No" in Sections 1 or 2. Deficient items must be corrected in a timely manner.

Item #	Corrective Action Planned/Taken	Date Corrected

Rev.0

CH2MHILL

H&S Self-Assessment Checklist - EXCAVATIONS

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees enter excavations (complete Sections 1 and 3), and/or 2) CH2M HILL oversight of an excavation subcontractor is required (complete entire checklist).

SSC/DSC may consult with excavation subcontractors when completing this checklist, but shall not direct the means and methods of excavation operations nor direct the details of corrective actions. Excavation subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Completed checklists shall be sent to the health and safety manager for review.

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

☐ Evaluate CH2M HILL employee exposures to excavation hazards
☐ Evaluate a CH2M HILL subcontractor's compliance with excavation H&S requirements
Subcontractors Name: _____

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the excavation subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HS-32.

SECTION 1	Yes	No	N/A	N/O
PERSONNEL SAFE WORK PRACTICES (3.1)				
1. Competent person has completed daily inspection and has authorized entry	☐	☐	☐	☐
2. Personnel aware of entry requirements established by competent person	☐	☐	☐	☐
3. Protective systems are free from damage and in stable condition	☐	☐	☐	☐
4. Surface objects/structures secured from falling into excavation	☐	☐	☐	☐
5. Potential hazardous atmospheres have been tested and found to be at safe levels	☐	☐	☐	☐
6. Precautions have been taken to prevent cave-in from water accumulation in the excavation	☐	☐	☐	☐
7. Personnel wearing appropriate PPE, per HSP/FSI	☐	☐	☐	☐

SECTION 2	Yes	No	N/A	N/O
GENERAL (3.2.1)				
8. Daily safety briefing/meeting conducted with personnel	☐	☐	☐	☐
9. Excavation and protective systems adequately inspected by competent person	☐	☐	☐	☐
10. Defective protective systems or other unsafe conditions corrected before entry	☐	☐	☐	☐
11. Guardrails provided on walkways over excavation 6' or deeper	☐	☐	☐	☐
12. Barriers provided at excavations 6' or deeper when not readily visible	☐	☐	☐	☐
13. Barriers or covers provided for wells, pits, shafts, or similar excavation 6' or deeper	☐	☐	☐	☐
14. Excavating equipment operated safely (use earthmoving equipment checklist in HS-27)	☐	☐	☐	☐
PRIOR TO EXCAVATING (3.2.2)				
15. Location of underground utilities and installations identified	☐	☐	☐	☐
EXCAVATING ACTIVITIES (3.2.3)				
16. Rocks, trees, and other unstable surface objects removed or supported	☐	☐	☐	☐
17. Exposed underground utility lines supported	☐	☐	☐	☐
18. Undermined surface structures supported or determined to be in safe condition	☐	☐	☐	☐
19. Warning system used to remind equipment operators of excavation edge	☐	☐	☐	☐
EXCAVATION ENTRY (3.2.4)				
20. Trenches > 4' deep provided with safe means of egress within 25'	☐	☐	☐	☐
21. Structure ramps designed and approved by competent person	☐	☐	☐	☐
22. Potential hazardous atmospheres tested prior to entry	☐	☐	☐	☐
23. Rescue equipment provided where potential for hazardous atmospheres exists	☐	☐	☐	☐
24. Ventilation used to control hazardous atmospheres and air tested frequently	☐	☐	☐	☐
25. Appropriate respiratory protection used when ventilation does not control hazards	☐	☐	☐	☐
26. Precautions taken to prevent cave-in from water accumulation in the excavation	☐	☐	☐	☐
27. Precautions taken to prevent surface water from entering excavation	☐	☐	☐	☐
28. Protection provided from falling/rolling material from excavation face	☐	☐	☐	☐
29. Spoil piles, equipment, materials restrained or kept at least 2' from excavation edge	☐	☐	☐	☐
EXCAVATION PROTECTIVE SYSTEMS (3.2.5)				
30. Protective systems used for excavations 5' or deeper	☐	☐	☐	☐
31. Protective systems for excavation deeper than 20' designed by registered PE	☐	☐	☐	☐
32. If soil unclassified, maximum allowable slope is 34 degrees	☐	☐	☐	☐
33. Protective systems free from damage	☐	☐	☐	☐
34. Protective system used according to manufacturer recommendations and not subjected to loads exceeding design limits	☐	☐	☐	☐
35. Protective system components securely connected to prevent movement or failure	☐	☐	☐	☐
36. Cave-in protection provided while entering/exiting shielding systems	☐	☐	☐	☐
37. Personnel removed from shielding systems when installed, removed, or vertical movement	☐	☐	☐	☐
PROTECTIVE SYSTEM REMOVAL (3.2.6)				
38. Protective system removal starts and progresses from excavation bottom	☐	☐	☐	☐
39. Protective systems removed slowly and cautiously	☐	☐	☐	☐
40. Temporary structure supports used if failure of remaining components observed	☐	☐	☐	☐
41. Backfilling taking place immediately after protective system removal	☐	☐	☐	☐
EXCAVATING AT HAZARDOUS WASTE SITES (3.2.7)				
42. Waste disposed of according to HSP	☐	☐	☐	☐
43. Appropriate decontamination procedures being followed, per HSP	☐	☐	☐	☐

SECTION 3

Complete this section for all items checked "No" in Sections 1 or 2. Deficient items must be corrected in a timely manner.

Item #	Corrective Action Planned/Taken	Date Corrected

CH2M HILL HEALTH AND SAFETY PLAN

Attachment 6

Applicable Material Safety Data Sheets

AIR LIQUIDE AMERICA CORP-FMLY BIG THREE INDUS -- ISOBUTYLENE - CALIBRATION GAS CYLINDER
MATERIAL SAFETY DATA SHEET
NSN: 6665012148247
Manufacturer's CAGE: 17688
Part No. Indicator: A
Part Number/Trade Name: ISOBUTYLENE

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General Information

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Item Name: CALIBRATION GAS CYLINDER
Company's Name: AIR LIQUIDE AMERICA CORP-FMLY BIG THREE INDUSTRIES
Company's Street: 3535 W 12TH ST
Company's P. O. Box: 3047
Company's City: HOUSTON
Company's State: TX
Company's Country: US
Company's Zip Code: 77253
Company's Emerg Ph #: 800-424-9300 CHEMTREC
Company's Info Ph #: 713-868-0440 FAX: 800-231-1366
Distributor/Vendor # 1: HNU SYSTEMS INC
Distributor/Vendor # 1 Cage: 57631
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 005
Status: SE
Date MSDS Prepared: 20FEB97
Safety Data Review Date: 19AUG97
Supply Item Manager: CX
MSDS Preparer's Name: UNKNOWN
Preparer's Company: CHEMICAL SAFETY ASSOCIATES, INC.
Preparer's St Or P. O. Box: 9163 CHESAPEAKE DR
Preparer's City: SAN DIEGO
Preparer's State: CA
Preparer's Zip Code: 92123-1002
MSDS Serial Number: CFCVY
Specification Number: NONE
Spec Type, Grade, Class: NONE
Hazard Characteristic Code: G3
Unit Of Issue: EA
Unit Of Issue Container Qty: 0.6 LB
Type Of Container: CYLINDER
Net Unit Weight: 0.6

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: ISOBUTYLENE (CYLINDER CONTAINS 75 PPM IN AIR).
Ingredient Sequence Number: 01
Percent: <1
NIOSH (RTECS) Number: UD0890000
CAS Number: 115-11-7
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: AIR

Ingredient Sequence Number: 02
Percent: 99
NIOSH (RTECS) Number: 1005486AI
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: COLORLESS GAS: ODOR SIMILAR TO BURNING COAL.
Boiling Point: 19.6F,-6.9C
Melting Point: -220F,-140C
Vapor Pressure (MM Hg/70 F): 1233
Vapor Density (Air=1): 0.15LB/FT3
Specific Gravity: 1.997
Evaporation Rate And Ref: NOT APPLICABLE
Solubility In Water: INSOLUBLE
Autoignition Temperature: 869F

Fire and Explosion Hazard Data

Flash Point: 14F,-10C
Lower Explosive Limit: 1.8
Upper Explosive Limit: 9.6
Extinguishing Media: SHUT OFF SOURCE OF GAS. USE WATER SPRAY TO COOL FIRE EXPOSED CYLINDERS, STRUCTURES AND EQUIPMENT.
Special Fire Fighting Proc: STRUCTURAL FIREFIGHTERS MUST WEAR SELF-CONTAINED BREATHING APPARATUS. BECAUSE OF DANGER OF BLEVE, EVACUATION OF NON-EMERGENCY PERSONNEL IS ESSENTIAL.
Unusual Fire And Expl Hazrds: DANGER! FIRES IMPINGING ON OUTSIDE SURFACE OF UNPROTECTED CYLINDERS CAN BE VERY DANGEROUS. EXPOSURE TO FIRE CAN CAUSE CATASTROPHIC FAILURE OF THE CYLINDER.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): CONTACT WITH INCOMPATIBLE MATERIALS AND EXPOSURE TO HEAT, SPARKS, OTHER SOURCES OF IGNITION.
Materials To Avoid: STRONG OXIDIZING AGENTS (EG. CHLORINE, BROMINE PENTAFLUORIDE, OXYGEN, OXYGEN DIFLUORIDE, NITROGEN TRIFLUORIDE).
Hazardous Decomp Products: WHEN IGNITED IN PRESENCE OF OXYGEN-CARBON MONOXIDE AND CARBON DIOXIDE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): WILL NOT OCCUR.

Health Hazard Data

LD50-LC50 Mixture: LC50 (INHALATION, RAT)-620,000 MG/KG/4HR
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ISOBUTYLENE MAY CAUSE SOME IRRITATION OF MUCOUS MEMBRANES. IN ADDITION, CONTACT WITH RAPIDLY EXPANDING GASES CAN CAUSE FROSTBITE TO EXPOSED TISSUE. ISOBUTYLENE IS NOT KNOWN TO CAUSE SENSITIZATION IN HUMANS. CURRENTLY, BIOLOGICAL EXPOSURE INDICES (BEI'S) ARE NOT APPLICABLE FOR ISOBUTYLENE.
Carcinogenicity - NTP: NO

Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: ISOBUYLENE IS NOT FOUND ON THE FOLLOWING LISTS: FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA.
Signs/Symptoms Of Overexp: IRRITATION OF MUCOUS MEMBRANES; FROSTBITE TO EXPOSED TO TISSUE.
Med Cond Aggravated By Exp: ACUTE OR CHRONIC RESPIRATORY CONDITIONS MAY BE AGGRAVATED BY OVEREXPOSURE TO THE COMPONENTS OF THIS PRODUCT.
Emergency/First Aid Proc: ADMINISTER OXYGEN, IF NECESSARY; TREAT SYMPTOMS; REDUCE OR ELIMINATE EXPOSURE.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUATE IMMEDIATE AREA. UNCONTROLLED RELEASES SHOULD BE RESPONDED TO BY TRAINED PERSONNEL USING PRE-PLANNED PROCEDURES. PROPER PROTECTIVE EQUIPMENT SHOULD BE USED. IN CASE OF GAS RELEASE, CLEAR THE AFFECTED AREA, PROTECT PEOPLE AND RESPOND.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: WASTE DISPOSAL MUST BE IN ACCORDANCE WITH APPROPRIATE LOCAL, STATE AND FEDERAL REGULATIONS. RETURN CYLINDERS WITH ANY RESIDUAL PRODUCT TO AIR LIQUIDE. DO NOT DISPOSE OF LOCALLY.
Precautions-Handling/Storing: STORE UPRIGHT & FIRMLY SECURED TO PREVENT FALLING OR BEING KNOCKED OVER. STORE IN A COOL, DRY, WELL-VENTILATED PLACE AWAY FROM SOURCES OF HEAT.
Other Precautions: KEEP STORAGE AREA CLEAR OF MATERIALS WHICH MAY BURN. DO NOT ALLOW AREA WHERE CYLINDERS ARE STORED TO EXCEED 125F (52C). STORE CYLINDERS AWAY FROM HEAVILY TRAFFICKED AREAS AND EMERGENCY EXITS. PROTECT AGAINST PHYSICAL DAMAGE.

Control Measures

Respiratory Protection: MAINTAIN OXYGEN LEVELS ABOVE 19.5% IN THE WORKPLACE. USE SUPPLIED AIR RESPIRATORY PROTECTION IF OXYGEN LEVELS ARE BELOW 19.5% OR DURING EMERGENCY RESPONSE TO A RELEASE OF THIS PRODUCT. FOLLOW 29 CFR 1910.134 OR EQUIVALENT STATE STANDARDS.
Ventilation: USE EXPLOSION-PROOF LOCAL EXHAUST VENTILATION TO PREVENT ISOBUTYLENE CONCENTRATION FROM EXCEEDING LEL OF 1.8%.
Protective Gloves: LEATHER GLOVES WHEN HANDLING CYLINDERS.
Eye Protection: SAFETY GLASSES.
Other Protective Equipment: USE BODY PROTECTION APPROPRIATE FOR TASK. COTTON CLOTHING RECOMMENDED TO PREVENT STATIC BUILD-UP.
Work Hygienic Practices: WASH HANDS AFTER HANDLING AND BEFORE EATING, DRINKING, OR SMOKING. LAUNDER CONTAMINATED CLOTHES BEFORE REUSE.
Suppl. Safety & Health Data: HNU P/N IS: 101-350-N. MSDS BY MFR WRITTEN FOR "PURE" ISOBUTYLENE; PHYSICAL & FIRE DATA AREAS ARE FOR PURE IOSBUTYLENE. THIS NSN IS FOR A CYLINDER CONTAINING 75-150 PPM (<1%) OF ISOBUTYLENE.

Transportation Data

Trans Data Review Date: 97231
DOT PSN Code: DQQ
DOT Proper Shipping Name: COMPRESSED GASES, N.O.S.
DOT Class: 2.2
DOT ID Number: UN1956
DOT Label: NONFLAMMABLE GAS
IMO PSN Code: EQH

IMO Proper Shipping Name: COMPRESSED GAS, N.O.S. o
IMO Regulations Page Number: 2124
IMO UN Number: 1956
IMO UN Class: 2(2.2)
IMO Subsidiary Risk Label: -
IATA PSN Code: HDO
IATA UN ID Number: 1956
IATA Proper Shipping Name: COMPRESSED GAS, N.O.S. *
IATA UN Class: 2.2
IATA Label: NON-FLAMMABLE GAS
AFI PSN Code: HDO
AFI Prop. Shipping Name: COMPRESSED GAS, N.O.S.
AFI Class: 2.2
AFI ID Number: UN1956
AFI Basic Pac Ref: A6.3,A6.5,A6.7
N.O.S. Shipping Name: CONTAINS ISOBUTYLENE AND AIR
Additional Trans Data: CYLINDER CONTAINS 75-150 PPM ISOBUTYLENE IN AIR. WEIGHT OF GAS MIXTURE IN EACH CYLINDER IS 0.6 LBS. WT OF EMPTY CYLINDER IS 2.4 LBS.

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Disposal Data

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Label Data

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Label Required: YES
Technical Review Date: 19AUG97
Label Status: F
Common Name: ISOBUTYLENE
Chronic Hazard: NO
Signal Word: WARNING!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: CONTENTS UNDER PRESSURE! ISOBUTYLENE MAY CAUSE SOME IRRITATION OF MUCOUS MEMBRANES. IN ADDITION, CONTACT WITH RAPIDLY EXPANDING GASES CAN CAUSE FROSTBITE TO EXPOSED TISSUE. ISOBUTYLENE IS NOT KNOWN TO CAUSE SENSITIZATION IN HUMANS. CURRENTLY, BIOLOGICAL EXPOSURE RESPIRATORY SYSTEM. FIRST AID: ADMINISTER OXYGEN, IF NECESSARY; TREAT SYMPTOMS; REDUCE OR ELIMINATE EXPOSURE.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: AIR LIQUIDE AMERICA CORP-FMLY BIG THREE INDUSTRIES
Label Street: 3535 W 12TH ST
Label P.O. Box: 3047
Label City: HOUSTON
Label State: TX
Label Zip Code: 77253
Label Country: US
Label Emergency Number: 800-424-9300 CHEMTREC
Year Procured: 1995

HAWK CREEK LABS -- HYDROCHLORIC ACID - HYDROCHLORIC ACID,ACS
MATERIAL SAFETY DATA SHEET
NSN: 6810001450477
Manufacturer's CAGE: 61084
Part No. Indicator: A
Part Number/Trade Name: HYDROCHLORIC ACID

General Information

Item Name: HYDROCHLORIC ACID,ACS
Company's Name: HAWK CREEK LABS INC
Company's Street: RD 1 SIMPSON RD
Company's P. O. Box: 686
Company's City: GLEN ROCK
Company's State: PA
Company's Country: US
Company's Zip Code: 17327
Company's Emerg Ph #: 717-235-3849
Company's Info Ph #: 717-235-3849
Record No. For Safety Entry: 003
Tot Safety Entries This Stk#: 005
Status: SMJ
Date MSDS Prepared: 01MAR90
Safety Data Review Date: 25NOV91
Supply Item Manager: HX
MSDS Serial Number: BLMSR
Hazard Characteristic Code: C1
Unit Of Issue: BT
Unit Of Issue Container Qty: 16 OUNCES
Type Of Container: BOTTLE
Net Unit Weight: 1.2 LBS

Ingredients/Identity Information

Proprietary: NO
Ingredient: HYDROGEN CHLORIDE (HYDROCHLORIC ACID) (SARA III)
Ingredient Sequence Number: 01
Percent: 37
NIOSH (RTECS) Number: MW4025000
CAS Number: 7647-01-0
OSHA PEL: C 5 PPM
ACGIH TLV: C 5 PPM; 9192

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, COLORLESS LIQUID WITH ACRID ODOR.
Boiling Point: 230F,110C
Melting Point: -101F,-74C
Vapor Density (Air=1): 1.25
Specific Gravity: 1.18
Solubility In Water: MISCIBLE

Fire and Explosion Hazard Data

Flash Point: NONFLAMMABLE
Extinguishing Media: DRY CHEMICAL.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA AND FULL

PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: REACTS WITH MOST METALS TO FORM HYDROGEN GAS WHICH CAN FORM EXPLOSIVE MIXTURES WITH AIR.

Reactivity Data

Cond To Avoid (Stability): HEAT AND CONTACT WITH BASES, OXIDIZERS, AND METAL POWDERS.
Materials To Avoid: NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomp Products: HCL GAS.
Conditions To Avoid (Poly): NONE SPECIFIED BY MANUFACTURER.

Health Hazard Data

LD50-LC50 Mixture: LD50:ORAL(RBT) 900 MG/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: CONTACT CAUSES PERMANENT DAMAGE TO EYES, SEVERE BURNS, AND ULCERATIONS ON SKIN. INHALATION OF VAPORS WILL DAMAGE RESPIRATORY TRACT.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT.
Signs/Symptoms Of Overexp: SEE HEALTH HAZARDS.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES: FLUSH WITH WATER FOR AT LEAST 15 MIN; GET IMMED MED ASSISTANCE. SKIN: REMOVE CONTAMINATED CLOTHING AND WASH WITH SOAP AND WATER. INHAL: MOVE TO FRESH AIR AND GIVE ARTF RESP IF BREATHING HAS STOPPED. INGEST: DO NOT INDUCE VOMITING. GIVE MILK OR WATER IF CONSCIOUS. GET IMMED MED ATTN. GET MED ASSISTANCE FOR ALL CASES OF OVEREXPOSURE.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: NEUTRALIZE WITH SODA ASH, ABSORB WITH SAND OR VERMICULITE AND SCOOP UP AND CONTAINERIZE FOR PROPER DISPOSAL.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: COMPLY WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.
Precautions-Handling/Storing: KEEP CONTR TIGHTLY CLSD. STORE IN COOL, DRY/ WELLVENTD AREA. KEEP AWAY FROM IGNIT SOURCE. WASH THORO AFTER HNDLG. EMPTY CONTR MAY BE HAZ DUE TO(SUPDAT
Other Precautions: DO NOT GET IN EYES, ON SKIN OR CLOTHING. DO NOT BREATHE VAPORS OR MIST.

Control Measures

Respiratory Protection: WEAR NIOSH/MSHA APPROVED SCBA IN HIGH VAPOR AREAS.
Ventilation: PROVIDE ADEQUATE GENERAL AND LOCAL EXHAUST VENTILATION.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: CHEM WORK GOG W/FULL LENGTH FSHLD(FP N).
Other Protective Equipment: EMERGENCY EYEWASH AND DELUGE SHOWER (FP N).
Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING.
Suppl. Safety & Health Data: HNDLG/STOR PREC: RETAINED RESIDUE.

Transportation Data

Trans Data Review Date: 92006
DOT PSN Code: HJG
DOT Proper Shipping Name: HYDROCHLORIC ACID, SOLUTION
DOT Class: 8
DOT ID Number: UN1789
DOT Pack Group: II
DOT Label: CORROSIVE
IMO PSN Code: IEX
IMO Proper Shipping Name: HYDROCHLORIC ACID
IMO Regulations Page Number: 8183
IMO UN Number: 1789
IMO UN Class: 8
IMO Subsidiary Risk Label: -
IATA PSN Code: NPG
IATA UN ID Number: 1789
IATA Proper Shipping Name: HYDROCHLORIC ACID
IATA UN Class: 8
IATA Label: CORROSIVE
AFI PSN Code: NPG
AFI Symbols: T
AFI Prop. Shipping Name: HYDROCHLORIC ACID, SOLUTION
AFI Class: 8
AFI ID Number: UN1789
AFI Pack Group: II
AFI Special Prov: A3,A6,N41
AFI Basic Pac Ref: 12-5

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 25NOV91
Label Date: 28OCT91
Label Status: G
Common Name: HYDROCHLORIC ACID
Signal Word: DANGER!
Acute Health Hazard-Severe: X
Contact Hazard-Severe: X
Fire Hazard-Slight: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE: COMBUSTIBLE. INHALATION WILL DAMAGE RESPIRATORY TRACT. CONTACT CAUSES PERMANENT DAMAGE TO EYES, SEVERE BURNS, AND ULCERATIONS ON SKIN. CHRONIC EFFECTS: NONE LISTED BY MFR.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: HAWK CREEK LABS INC
Label Street: 686 SIMPSON RD
Label P.O. Box: RD 1
Label City: GLEN ROCK
Label State: PA
Label Zip Code: 17327
Label Country: US
Label Emergency Number: 717-235-3849

WATER CHEMISTRY -- NITRIC ACID - NITRIC ACID,REAGENT
MATERIAL SAFETY DATA SHEET
NSN: 6810002709978
Manufacturer's CAGE: 66378
Part No. Indicator: B
Part Number/Trade Name: NITRIC ACID

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General Information

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Item Name: NITRIC ACID,REAGENT
Company's Name: WATER CHEMISTRY, INC
Company's Street: 3404 AERIAL WAY DR SW
Company's P. O. Box: 4273
Company's City: ROANOKE
Company's State: VA
Company's Country: US
Company's Zip Code: 24015
Company's Emerg Ph #: 703-989-0400
Company's Info Ph #: 703-989-0400
Record No. For Safety Entry: 011
Tot Safety Entries This Stk#: 011
Status: FE
Date MSDS Prepared: 17JAN95
Safety Data Review Date: 09SEP97
Supply Item Manager: CX
MSDS Preparer's Name: UNKNOWN.
MSDS Serial Number: CFKDD
Specification Number: MIL-W-15000K/SH/
Spec Type, Grade, Class: CLASS A
Hazard Characteristic Code: C1
Unit Of Issue: QT
Unit Of Issue Container Qty: 1 QT
Type Of Container: GLASS BOTTLE
Net Unit Weight: >2.1 LBS
NRC/State License Number: NOT RELEVANT

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: NITRIC ACID (SARA 302/313) (CERCLA)
Ingredient Sequence Number: 01
Percent: UNKNOWN
NIOSH (RTECS) Number: QU5775000
CAS Number: 7697-37-2
OSHA PEL: 2 PPM
ACGIH TLV: 2 PPM/4 STEL; 9596
Other Recommended Limit: NONE RECOMMENDED

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Physical/Chemical Characteristics

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Appearance And Odor: CLEAR LIQUID - NITROUS ODOR
Boiling Point: UNKNOWN
Melting Point: UNKNOWN
Vapor Pressure (MM Hg/70 F): UNKNOWN
Vapor Density (Air=1): UNKNOWN
Specific Gravity: UNKNOWN
Decomposition Temperature: UNKNOWN

Evaporation Rate And Ref: UNKNOWN
Solubility In Water: COMPLETE
Viscosity: UNKNOWN.
Radioactivity: NOT RELEVANT
Corrosion Rate (IPY): UNKNOWN

Fire and Explosion Hazard Data

Flash Point: NONE
Lower Explosive Limit: NOT RELEVANT
Upper Explosive Limit: NOT RELEVANT
Extinguishing Media: WATER SPRAY, CARBON DIOXIDE, FOAM OR DRY CHEMICAL FOR SURROUNDING FIRE. USE WATER SPRAY TO COOL FIRE EXPOSED CONTAINERS.
Special Fire Fighting Proc: WEAR PROTECTIVE CLOTHING AND NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS OPERATED IN POSITIVE PRESSURE MODE.
Unusual Fire And Expl Hazrds: NONE

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE
Materials To Avoid: STRONG OXIDIZING AGENTS, STRONG ALKALIS
Hazardous Decomp Products: OXIDES OF NITROGEN, NITRIC ACID
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: LD50 (ORAL, RAT) IS NOT KNOWN.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: TARGET ORGANS:EYES, SKIN, RESPIRATORY & GI TRACTS. ACUTE- EYE CONTACT CAUSES SEVERE IRRITATION. SKIN CONTACT MAY CAUSE IRRITATION. INHALATION MAY CAUSE RESPIRATORY TRACT IRRITATION. HARMFUL IF SWALLOWED. MAY CAUSE NAUSEA IF INGESTED. CHRONIC- UNKNOWN.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: SEVERE IRRITATION, REDNESS, NAUSEA, VOMITING, TEARING, PAIN
Med Cond Aggravated By Exp: PERSONS WITH PRE-EXISTING SKIN DISORDERS, EYE PROBLEMS OR IMPAIRED RESPIRATORY FUNCTION MAY BE MORE SUSCEPTIBLE TO THE EFFECTS OF THIS PRODUCT.
IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES. HOLD EYELIDS OPEN. SKIN:WASH WITH PLENTY OF WATER. INHALED:MOVE TO FRESH AIR. ORAL:DO NOT INDUCE VOMITING. CALL A PHYSICIAN IMMEDIATELY. NEVER GIVE FLUID IF PATIENT IS UNCONSCIOUS OR HAS CONVULSIONS.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: RECOVER AS MUCH MATERIAL AS POSSIBLE. ABSORB REMAINING OF SPILL WITH VERMICULITE. TRANSFER TO A SUITABLE CONTAINER FOR DISPOSAL. RINSE SPILL AREA WITH WATER.
Neutralizing Agent: SODIUM BICARBONATE
Waste Disposal Method: DISPOSE OF IN ACCORDANCE WITH ALL LOCAL, STATE AND

FEDERAL REGULATIONS. RECYLING IS RECOMMENDED.
Precautions-Handling/Storing: STORE IN CLOSED CONTAINER. KEEP AWAY FROM INCOMPATIBLE MATERIALS.
Other Precautions: WASH THOROUGHLY WITH SOAP AND WATER AFTER HANDLING AND BEFORE EATING, DRINKING, SMOKING. KEEP OUT OF REACH OF CHILDREN. DO NOT TAKE INTERNALLY. AVOID EYE AND SKIN CONTACT.

Control Measures

Respiratory Protection: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION IS HIGH, WEAR A NIOSH-APPROVED RESPIRATOR.
Ventilation: ADEQUATE
Protective Gloves: RUBBER
Eye Protection: SAFETY GLASSES/CHEMICAL SPLASH GOGGLES
Other Protective Equipment: EYE WASH STATION, SAFETY SHOWER, PROTECTIVE CLOTHING
Work Hygienic Practices: OBSERVE GOOD INDUSTRIAL HYGIENE PRACTICES AND RECOMMENDED PROCEDURES.
Suppl. Safety & Health Data: FORMULA CHANGED. FOR PREVIOUS FORMULATION, SEE PNI A, SAME NSN.

Transportation Data

Trans Data Review Date: 97252
DOT PSN Code: KFD
DOT Proper Shipping Name: NITRIC ACID
DOT Class: 8
DOT ID Number: UN2031
DOT Pack Group: II
DOT Label: CORROSIVE
DOT/DoD Exemption Number: NOT RELEVANT
IMO PSN Code: KPF
IMO Proper Shipping Name: NITRIC ACID
IMO Regulations Page Number: 8195
IMO UN Number: 2031
IMO UN Class: 8
IMO Subsidiary Risk Label: -
IATA PSN Code: RWF
IATA UN ID Number: 2031
IATA Proper Shipping Name: NITRIC ACID
IATA UN Class: 8
IATA Label: CORROSIVE
AFI PSN Code: RWF
AFI Prop. Shipping Name: NITRIC ACID,
AFI Class: 8
AFI ID Number: UN2031
AFI Pack Group: II
AFI Special Prov: P4
AFI Basic Pac Ref: A12.11
Additional Trans Data: UNIT OF ISSUE: 32 OUNCES.

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 09SEP97
MFR Label Number: UNKNOWN
Label Status: F
Common Name: NITRIC ACID
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Moderate: X
Fire Hazard-None: X
Reactivity Hazard-Slight: X
Special Hazard Precautions: TARGET ORGANS:EYES, SKIN, RESPIRATORY & GI TRACTS. ACUTE- EYE CONTACT CAUSES SEVERE IRRITATION. SKIN CONTACT MAY CAUSE IRRITATION. INHALATION MAY CAUSE RESPIRATORY TRACT IRRITATION. HARMFUL IF SWALLOWED. MAY CAUSE NAUSEA IF INGESTED. CHRONIC- UNKNOWN. STORE AWAY FROM INCOMPATIBLES. ABSORB SPILL WITH VERMICULITE. TRANSFER TO A SUITABLE CONTAINER FOR DISPOSAL. RINSE SPILL AREA WITH WATER. FIRST AID- CALL PHYSICIAN IF SYMPTOMS PERSIST. EYE:IMMEDIATELY FLUSH WITH WATER FOR 15 MINUTES. HOLD EYELIDS OPEN. SKIN:WASH WITH PLENTY OF WATER. INHALED:MOVE TO FRESH AIR. ORAL:DO NOT INDUCE VOMITING. CALL A PHYSICIAN IMMEDIATELY.
Protect Eye: Y
Protect Skin: Y
Label Name: WATER CHEMISTRY, INC
Label Street: 3404 AERIAL WAY DR SW
Label P.O. Box: 4273
Label City: ROANOKE
Label State: VA
Label Zip Code: 24015
Label Country: US
Label Emergency Number: 703-989-0400
Year Procured: 1996

GREAT LAKES INSTRUMENTS -- STANDARD CELL 7 PH BUFFER
MATERIAL SAFETY DATA SHEET
NSN: 685000F027508
Manufacturer's CAGE: 52998
Part No. Indicator: A
Part Number/Trade Name: STANDARD CELL 7 PH BUFFER

General Information

Company's Name: GREAT LAKES INSTRUMENTS INC
Company's Street: 8855 N. 55TH STREET
Company's City: MILWAUKEE
Company's State: WI
Company's Country: US
Company's Zip Code: 53223-2311
Company's Emerg Ph #: 414-355-3601
Company's Info Ph #: 414-355-3601
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 09MAR92
Safety Data Review Date: 28JUN93
Preparer's Company: GREAT LAKES INSTRUMENTS INC
Preparer's St Or P. O. Box: 8855 N. 55TH STREET
Preparer's City: MILWAUKEE
Preparer's State: WI
Preparer's Zip Code: 53223-2311
MSDS Serial Number: BQZQT
Hazard Characteristic Code: N1

Ingredients/Identity Information

Proprietary: NO
Ingredient: WATER
Ingredient Sequence Number: 01
Percent: >87
NIOSH (RTECS) Number: ZC0110000
CAS Number: 7732-18-5

Proprietary: NO
Ingredient: POTASSIUM CHLORIDE
Ingredient Sequence Number: 02
Percent: <5
NIOSH (RTECS) Number: TS8050000
CAS Number: 7447-40-7

Proprietary: NO
Ingredient: POTASSIUM PHOSPHATE (MONOBASIC) *93-1*
Ingredient Sequence Number: 03
Percent: <3
NIOSH (RTECS) Number: 1002090PP
CAS Number: 7778-77-0

Proprietary: NO
Ingredient: DISODIUM EDETATE; ACETIC ACID, (ETHYLENEDINITRILO)TETRA-, DISODIUM SALT; EDTA DISODIUM
Ingredient Sequence Number: 04

Percent: <3
NIOSH (RTECS) Number: AH4375000
CAS Number: 139-33-3

Proprietary: NO
Ingredient: SODIUM HYDROXIDE, CAUSTIC SODA, LYE
Ingredient Sequence Number: 05
Percent: <1
NIOSH (RTECS) Number: WB4900000
CAS Number: 1310-73-2
OSHA PEL: 2 MG/M3
ACGIH TLV: C 2 MG/M3; 9293
Other Recommended Limit: 2MG/M3 CEILING NIOSH

Proprietary: NO
Ingredient: THYMOL
Ingredient Sequence Number: 06
Percent: <1
NIOSH (RTECS) Number: XP2275000
CAS Number: 89-83-8

Physical/Chemical Characteristics

Appearance And Odor: PINK COLOR, SLIGHT TYME ODOR.

Fire and Explosion Hazard Data

Flash Point: NON-FLAMMABLE
Extinguishing Media: ANY MEANS SUITABLE FOR OTHER MATERIALS INVOLVED.

Reactivity Data

Stability: YES
Hazardous Poly Occur: NO

Health Hazard Data

Route Of Entry - Inhalation: NO
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: EYES: IRRITATION.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Emergency/First Aid Proc: SKIN: FLUSH W/WATER. EYES: FLUSH THOROUGHLY W/WATER. INGESTION: OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: TAKE UP ON ABSORBENT-FLUSH AREA W/WATER.
Waste Disposal Method: FLUSH TO SEWER W/EXCESS WATER IF LOCAL REGULATIONS PERMIT.
Precautions-Handling/Storing: KEEP IN TIGHTLY CLOSED CONTAINER. MAY STAIN CLOTHING.

Control Measures

Eye Protection: SAFETY GLASSES
Work Hygienic Practices: WASH THOROUGHLY AFTER USE.

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 28JUN93
Label Date: 27APR93
Label Status: F
Common Name: STANDARD CELL 7 PH BUFFER
Chronic Hazard: NO
Signal Word: CAUTION!
Acute Health Hazard-None: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: EYES: IRRITATION. EYES/SKIN: IRRITATION. INHALATION: MUCOUS MEMBRANE IRRITATION. INGESTION: HARMFUL, MAY CAUSE BLURRED VISION. TARGET ORGANS: EYES.
Protect Eye: Y
Label Name: GREAT LAKES INSTRUMENTS INC
Label Street: 8855 N. 55TH STREET
Label City: MILWAUKEE
Label State: WI
Label Zip Code: 53223-2311
Label Country: US
Label Emergency Number: 414-355-3601
Year Procured: UNK